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TECHNICAL NOTES

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LAKE STATES FOREST EXPERIMENT STATION
U.S. DEPARTMENT OF AGRICULTURE U.S. FOREST SERVICE

No. 543

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Control of the European Pine Shoot Moth with Concentrated DDT Sprays

In an effort to reduce the large gallonages of water used in hydraulic sprays for European pine shoot moth control, concentrated sprays applied by mist blower were tested during the spring and summer of 1956, the summer of 1957, and the spring of 1958 in Ottawa County, Lower Michigan. The good control obtained with volumes of less than 50 gallons of spray per acre makes concentrate spraying a promising method.

The test treatments were applied to replicated $\frac{1}{2}$ - or 1-acre plots of red pine trees mostly from 4 to 6 feet tall. Applications were made at two different times: in late June when newly hatched larvae were just beginning to feed and in the middle of April when partly grown larvae were just resuming their feeding after hibernation. Several mixtures were tried ranging from $2\frac{1}{2}$ - to 12-percent DDT at rates of from 5 to 40 gallons of spray per acre. Evaluations were made later by comparing the numbers of insects on the treated plots with those on nearby untreated plots.

Mist blowers generate a high-velocity blast of air to carry the spray, thereby making it possible to reduce the quantity of liquid in the spray mixture. The more effective of the two mist blower models used in these tests moved 28,000 cubic feet of air per minute at a velocity of 100 miles per hour. It discharged spray from a single jet in the center of the airstream, and is a type widely used in shade tree protection work. However, this machine had to be moved over each test area from 2 to 4 times at the slowest tractor speeds to attain the rate of application shown by this study to be best. This model would therefore not have practical value in shoot moth control work. However, mist blowers with higher spray outputs and higher air volume movements are available and should be used in field operations. One such model, shown in the figure on the back, was used during an actual control operation on the Lower Michigan National Forest.

The least DDT concentration and liquid spray volume required to reduce populations 90 percent or more in both the summer and spring tests was $2\frac{1}{2}$ -percent DDT at 40 gallons of spray per acre. On one plot with smaller than average trees, similar results were obtained with a lower volume of spray. Satisfactory coverage of the experimental areas by a hydraulic sprayer would have required between 300 and 500 gallons of spray per acre. The concentrated mist-blower spray therefore accomplished practically the same result with roughly one-tenth the spray volume. An added advantage was that 5 rows of trees spaced at 6x6 feet were treated at one time.

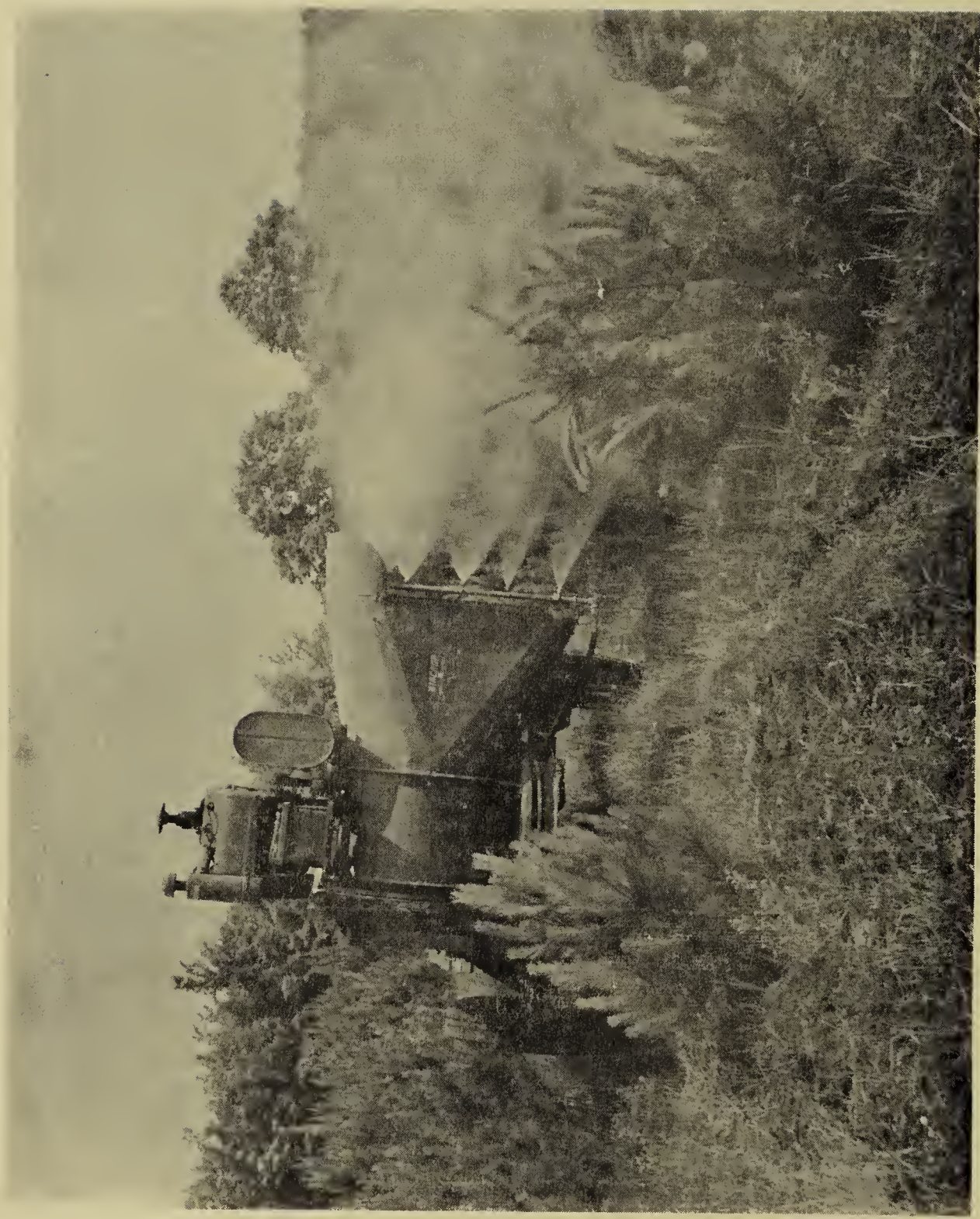
Suggested mist-blower spray mixtures and application rates based on these experiments are as follows: trees 4 to 6 feet tall--50 gallons per acre mixed at the rate of 1 gallon of 25-percent emulsifiable DDT concentrate per 9 gallons of water; trees less than 4 feet tall--35 gallons per acre of the same mixture. Spraying should not be attempted at wind velocities of more than 7 miles per hour. Also, excessive brush should be removed for best results.

The timing for concentrated mist-blower sprays in Lower Michigan is the same as for hydraulic sprays: spring applications at first external evidence of larval activity (about mid-April); summer applications when the new larvae begin hatching (late June or early July).

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This type of mist blower was successfully used in
control operations in 1958 in Lower Michigan.